REMARKS

By this amendment, claims 1-5, 7-15, 17-21 and 32-85 are pending in the application. Of these, claims 50, 56 and 62 are being amended and claims 83-85 are being added. Claim 70 is being canceled, and claims 22-31 remain withdrawn. The amendments and new claims are fully supported by the originally filed specification and original claims and add no new matter. Entry of the amendments and new claims and reconsideration of the present case is respectfully requested.

Allowed Claims

Applicants appreciate the Examiner's indication that claims 1-5, 7-15, 17-21, 32-49, 67-69 and 71-81 were allowable.

Objected to Claim

The Examiner objected to claim 70 as "being a substantial duplicate of claim 81." Claim 70 is being canceled, and thus this objection is obviated.

Applicants appreciate the Examiner's indication that claims 51, 52, 55, 57, 58, 61, 63, 64, 66 and 70 would be allowable if rewritten in independent form including all of the limitations of their base claims.

Rejection Under 35 U.S.C. 102(e) of Claims 50, 53, 54, 56, 59, 60, 62 and 65

The Examiner rejected claims 50, 53, 54, 56, 59, 60, 62 and 65 under 35 U.S.C. 102(e) over U.S. Patent No. 6,248,252 to Nguyen et al. This rejection is respectfully traversed.

Claim 50, as amended, is not anticipated by Nguyen et al. because Nguyen et al. does not teach "placing a substrate comprising a silicon-contain ng

material in a process chamber, the silicon-containing material comprising at least one of silicon dioxide, silicon nitride, polysilicon, metal silicide and monocrystalline silicon; and etching the silicon-containing material by providing in the process chamber, an energized gas formed from a process gas comprising CF_4, chlorine-containing gas and sidewall-passivation gas," as recited in the claim.

Nguyen et al. discloses "dry anisotropic etching of the aluminum layer 48" (column 5, lines 19-20), where the aluminum layer can be "aluminum mixed with another constituent, such as, for example, copper silicon, gold, silver, titanium, or the like" (column 4, lines 40-42), such as a mixture with "1 wt % copper" (column 4, line 44.) and that could have small amounts (1wt %) of elemental silicon. Conventionally, when aluminum is deposited on a silicon surface, at certain temperatures, the silicon atoms at silicon surface diffuse into aluminum layer at the grain boundaries. This localized diffusion results in conical voids underneath the grain boundaries, which then become filled with aluminum to form "*spikes*" that can short-circuit the junction. On cooling the system, the solubility falls sharply causing the diffused silicon to precipitate out of the aluminum and onto the wafer surface, resulting in precipitated silicon islands. The solution to the spiking effect is to incorporate silicon atoms in aluminum layer, and usually a 1 wt% level of silicon is added to the aluminum, as taught by Nguyen et al.

Claim 50 is amended to recite etching of a silicon-containing material comprising at least one of silicon dioxide, silicon nitride, polysilicon, metal silicide and monocrystalline silicon. Etching an aluminum layer having trace amounts of silicon in an elemental form, as taught by Nguyen et al., is not the same as etching a silicon-containign material comprising silicon dioxide, silicon nitride, polysilicon, metal silicide or monocrystalline silicon. Monocrystalline silicon is formed of a few or one relatively continuous silicon crystal having silicon atoms in an ordered structure, as known to one of ordinary skill in the art. Polysilicon, short for polycrystalline silicon, comprises small grains of crystalline silicon. In contrast, an aluminum alloy containing additive silicon is a metal alloy and is not a crystalline silicon because the silicon atoms are mixed in the aluminum metal and do not form an ordered crystal structure. Accordingly,

polysilicon or monocrystalline silicon material is not taught by Nguyen et al, who simply teaches etching an aluminum metal alloy containing a small amount of silicon

Similarly, Nguyen does not teach etching silicon oxide, silicon nitride or a metal silicide. These materials comprise compounds having stoichiometric ratios of silicon with other element(s), such as for example a ratio of Si to N in silicon nitride of 3:4, a ratio of silicon to oxygen in silicon oxide of 1:2, and a ratio of silicon to tungsten in tungsten silicide of 1:2. In contrast, the spiked aluminum layer of Nguyen et al. is not a stoichiometric compound, and instead has individual elemental silicon atoms incorporated non-stoichiometrically into an aluminum alloy solid solution. Accordingly, Nguyen et al. does not teach etching of the silicon-containing materials recited in the claim or the advantages thereof, and claim 50 and the claims depending therefrom are not anticipated by Nguyen et al.

Claims 56 and 62 similarly recite "placing a substrate comprising a silicon-containing material in a process chamber, the silicon-containing material comprising at least one of silicon dioxide, silicon nitride, polysilicon, metal silicide and monocrystalline silicon" and "etching the silicon-containing material," and thus these claims and the claims depending therefrom are also not anticipated by Nguyen et al., for the same reasons.

CONCLUSION

The above-discussed amendments are believed to place the present application in condition for allowance. Should the Examiner have any questions regarding the above remarks, the Examiner is requested to telephone Applicant's representative at the number listed below.

Respectfully submitted,

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Date: July 28, 2003

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